

3.2 Medical Requirements Overview

TABLE 3.2: MEDICAL REQUIREMENTS OVERVIEW

MRID# and Title:	MR009L Pre- and Postflight Physical Exam for Long Duration Crews
Sponsor:	Medical Operations
IPT:	N/A
Category:	Medical Requirements (MR)
References:	<p>ISS Medical Operations Requirements Document (MORD), SSP 50260 Rev A:</p> <ul style="list-style-type: none"> Section 3.0: Medical Evaluations, Certification and Monitoring <p>Astronaut Medical Evaluation Requirements Document (AMERD), JSC 23834</p> <ul style="list-style-type: none"> Section II, Paragraph 2.7.2: Space Flight Medical Certification Appendix A, Section III: Medical Standards/Procedures, Paragraph 3.14, Full Flight Surgeon Physical Examination Appendix B, Section V: Pre- and Postflight Medical Evaluation Requirements for Long-Duration Flights (30 Days or More) Appendix B, Table B3: Pre- and Postflight Medical Evaluation Requirements for Long Duration Flight
Purpose/Objectives:	To assess the medical status of crewmembers for pre- and postflight long-duration missions.
Measurement Parameters:	Vital signs, head/face, mouth, throat, ears, nose, eyes, chest, cardiovascular, abdomen, musculoskeletal, skin, and neurologic
Deliverables:	A preflight and postflight physical examination report will be included in the crewmember's medical record and eventually to be archived in CMIS
Flight Duration:	≥ 30 days
Number of Flights:	Expedition 1 and subsequent flights
Number and Type of Crew Members Required:	All primary U.S. crewmembers. Back-up crew will only complete preflight MATs greater than L-45 days unless specifically waived by crew surgeon. If crew swap does occur, back-up crew will complete all preflight MATs.
Other Flight Characteristics:	N/A

3.3 Preflight Training – NO TRAINING

3.4 Preflight Activities

TABLE 3.4: PREFLIGHT ACTIVITIES

Preflight Activity	Description:	A full (L-30/45 days) and brief (L-10 & L-2 days) physical exam will be performed by the Flight Surgeon on the ISS crew. See Flight Surgeon Physical Exam Description on page 3.			
	Schedule:	Duration:	Schedule:	Flexibility:	Personnel Required:
		Full Exam: 60 minutes Brief Exam: 30 minutes	L-30/45 days L-10, L-2 days	N/A N/A	Flight Surgeon & crew Flight Surgeon & crew
Ground Support Requirements	Preflight Hardware:	Preflight Software:		Test Location:	
Hardware/Software	General physical exam hardware and consumables	N/A		U.S. or Russia	
Testing Facilities	Minimum Room Dimensions:	Number of Electrical Outlets:		Temperature Requirements:	Special Lighting:
	Standard physical exam room, 8' X 10'	1 required (4 desired) 110V for U.S. 220V for Russia		Normal	N/A
	Hot or Cold Running Water:	Privacy Requirements:		Vibration/Acoustic Isolation:	Other:
	Both are required	Private room and hallway (Neurologic), free from distraction		N/A	N/A
Constraints/Special Requirements:	N/A				
Launch Delay Requirements:	The Physical Exam will be repeated at the Crew Surgeon's discretion if launch is delayed.				
Notes:	N/A				
Data Delivery	Data/Report to Designated Recipients (Nominal/Contingency):				
	A preflight physical examination report will be included in the crewmember's medical record and eventually will be archived in CMIS.				

Flight Surgeon Physical Exam Description:

Full (L-30/45, R+0*, R+2*, R+10*, R+30):

- Vital signs: pulse and blood pressure recumbent, sitting, standing, body temperature, respiratory rate, height, and weight
- Head and face: nares/nasal mucosa, sinuses, maxillary and frontal
- Mouth and throat
- Ears: external meatus, tympanic membrane, and response to Valsalva
- Eyes: general appearance, extra-ocular movements, pupil reactivity, and ophthalmoscopic exam
- Neck: thyroid, vascular exam, motion
- Chest and lungs: cardiovascular exam, including cardiac auscultation, carotid and venous upstrokes, and peripheral pulses
- Abdomen: auscultation, palpitation of major organs and herniations
- Rectum/anus: to include prostate exam for males, rectal vault and occult blood testing
- Genitourinary exam: appearance, general exam, and herniations
- Breast exam
- Pelvic exam/Pap smear: for female crewmember (may be performed by a gynecologist)
- Extremities: to include range-of-motion and general strength assessments on a 1-5 scale
- Spine: general appearance and mobility
- Skin: to include lymphatics and identifying body marks
- Neurologic: to include standard functional exam and gait exam (see appended test)

* Excludes rectal, genitourinary, breast, and pelvic.

Brief (L-7/10, L-2, R+20):

- Vital signs: pulse and blood pressure, body temperature, respiratory rate, height, and weight
- Ear, Nose, and Throat
- Chest and Lungs
- Abdominal
- Extremities/Spine
- Neurologic

3.5 In-Flight Activities – NO IN-FLIGHT ACTIVITIES

3.6 Postflight Activities

TABLE 3.6: POSTFLIGHT ACTIVITIES

Postflight Activity	Description:	A full (R+0, R+2, R+10, R+30 days) and brief (R+20 days) physical exam will be performed by the Flight Surgeon on the ISS crew. See Flight Surgeon Physical Exam Description on page 3.			
	Schedule:	Duration:	Schedule:	Flexibility:	Personnel Required:
		60 minutes (Full) 30 minutes (Brief)	R+0, R+2*, R+10, R+30 days R+20 days	N/A N/A	Flight Surgeon & crew Flight Surgeon & crew
Ground Support Requirements Hardware/Software	Postflight Hardware:		Postflight Software:	Test Location:	
	General physical exam hardware and consumables		N/A	U.S. or Russia	
Testing Facilities	Minimum Room Dimensions:	Number of Electrical Outlets:		Temperature Requirements:	Special Lighting:
	Standard physical exam room, 8' X 10'	4 110V for U.S. 220V for Russia		Normal room temperature	N/A
	Hot or Cold Running Water:	Privacy Requirements:		Vibration/Acoustic Isolation:	Other:
	Both are required	Private room, free from distraction		N/A	N/A
Constraints/Special Requirements:		N/A			
Early Destow / Early Return:		N/A			
Notes:		*If R+2 is an off-duty day for the crew, the physical exam will be moved to R+3.			
Data Delivery	Data/Report to Designated Recipients (Nominal/Contingency):				
	A postflight physical examination report will be included in the crewmember's medical record and eventually will be archived in CMIS.				

3.7 Summary Schedule**TABLE 3.7: SUMMARY SCHEDULE**

ACTIVITY	DURATION	SCHEDULE	FLEXIBILITY	BLOOD VOLUME	PERSONNEL REQUIRED	CONSTRAINTS
Preflight Training – N/A						
Preflight						
Physical Exam	60 minutes (Full) 30 minutes (Brief)	L-30/45 days L-10, L-2 days	N/A N/A	N/A N/A	Attending FS and crewmember	N/A N/A
In-Flight – N/A						
Wheels-Stop – N/A						
Postflight						
Physical Exam	60 minutes (Full)	R+0, 2, 10, 30 days	N/A	N/A	Attending FS and crewmember	If R+2 is an off-duty day for the crew, the physical exam will be moved to R+3
	30 minutes (Brief)	R+20 days	N/A	N/A		N/A
Postflight Debrief						
N/A						

MR009L Pre- and Postflight Physical Exam for Long Duration Crews

MR009L
MSD-MO-046

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NEUROLOGICAL FUNCTION RATING SCALE

NAME

DATE

LAUNCH REFERENCE DAY/MISSION

TIME

I. Neurological Signs and Symptoms (circle all appropriate).

1. Headache

- 1 = None
- 2 = Resolved
- 3 = Intermittent
- 4 = Persistent

2. Dizziness/Faintness

- 1 = None
- 2 = Mild; Occasional (does not interfere with activity)
- 3 = Moderate; Frequent (interferes with some activity)
- 4 = Severe; Persistent (interferes with most activity)

3. Vertigo/Spinning

- 1 = None
- 2 = Mild; Occasional (does not interfere with activity)
- 3 = Moderate; Frequent (interferes with some activity)
- 4 = Severe; Persistent (interferes with most activity)

II. Motor Performance

4. Gaze/Ocular Movements

- 1 = Normal
- 2 = Mild Nystagmus; Quickly remits in one direction
- 3 = Moderate Nystagmus; Quickly remits in more than one direction
- 4 = Severe Nystagmus; Sustained in any one direction

5. Finger to nose (close eyes touch nose, open eyes touch finger)

- 1 = Normal
- 2 = Touches nose 1st attempt, misses finger 1st attempt
- 3 = Misses nose, touches finger 1st attempt
- 4 = Misses nose, misses finger 1st attempt

6. Drift (close eyes, extend arms, palms up)

- 1 = Normal
- 2 = Mild; One arm slight drift
- 3 = Moderate; Two arms slight drift
- 4 = Severe; Large drift of either arm

DTR	Right	Left
Biceps (C5)		
Triceps (C5, 6)		
Knee (L3, 4)		
Heel (S1)		

III. Gait and Station

7. Rising from chair (without use of arms)

- 1 = Normal
- 2 = Slow
- 3 = Tends to fall back, uses arms
- 4 = Uses arms to stand

8. Standing/Romberg (feet together, arms extended, close eyes) 30 seconds

- 1 = Normal
- 2 = Sway noted
- 3 = Catches self with leg extension
- 4 = Unable to perform with eyes close

9. Leg lift - Hop (close eyes, lift leg, hop 3 times, alternate)

- 1 = Normal
- 2 = Hops with eyes open
- 3 = Cannot stand on one foot with eyes closed
- 4 = Cannot perform

10. Tandem/Heel to toe walk (5 meters)

- 1 = Normal
- 2 = Performs with arms extended (sense of falling)
- 3 = Slips/leans to one side but recovers
- 4 = Cannot perform

11. Dynamic equilibrium (close eyes walk 9m turn 180 and return)

- 1 = Normal
- 2 = Walks straight, performs turn with difficulty
- 3 = Walks straight, cannot perform turn
- 4 = Cannot walk straight

0 = Absent

1 = Diminished

2 = Normal, Brisk

3 = Hyperactive, Exaggerated

4 = Clonus

Total 11 - 13 Normal.

14 - 15 Suspect

> 15 Consider referral to neurovestibular lab for posturography, gaze, and locomotion tests.

Signature